Here’s a start at a protocol for picking roots. We’re going to spend a lot of hours on this in the next few months, so all suggestions for improvement are welcome.

**Description of samples.**

We have root cores collected from two locations, Sleepers River (a Ca-rich site in Vermont) and Cone Pond (a base-poor site in New Hampshire). At Cone Pond,, there are two sites, one hardwood and one softwood. At Sleepers River, there are 3 sites: RH rich hardwoods, PH poor hardwoods, and SF spruce-fir. The overall objective is to compare root dynamics and nutrient cycling between hardwoods and softwoods and across the Ca gradient. We installed 5 minirhizotron tubes in each site, which will be monitored to study root dynamics. We collected root cores to estimate root biomass.

We collected 2 cores near each of the minirhizotron tubes. Each core was divided into 5 sections: O horizon, 0-5 cm, 5-10 cm, 10-15 cm, and 15-20 cm. There are some cores that were almost entirely organic, and these are divided into 5 sections of 5 cm each. The bags are labeled by location, site, tube number, replicate and depth. For example, SR SF 3 2 0-5 is from Sleepers River, spruce-fir, tube 3, core 2, dept 0-5 cm.

At a third site, Hubbard Brook in New Hampshire, roots from hardwood and softwood sites have already been measured. In order to compare roots from the three sites, our goal is to follow the same procedures for picking roots from cores as were applied in that study. Cindy Wood and Suzanne Wapner gave a lesson to BB and Ruth on July 10, 2002. I hope we can bring Suzanne up from Ithaca to check on use sometime soon, to help ensure consistency.

**Objectives of root picking**

1. We want the tree roots that were alive at the time the core was taken.
2. They will be divided into three size classes: <0.5mm,0.5-1mm, and >1mm. (We will also scan them to get more information on size distributions.)
3. They should be relatively free of soil, but we don’t want to wash them, because we will measure nutrient concentrations.
4. We don’t want fungal rhizomorphs or roots of non-vascular plants. We don’t want corms or anything that’s not a tree root.

**What to pick**

1. We will start with the mineral soil samples, because they are easier and quicker than the organic samples. All the samples from SR SF are organic. Some other samples labeled with mineral soil depths are also organic (might be noted “wood”).
2. We should alternate between cores from CP and SR. This will reduce bias that occurs over time.
3. One person may not pick both reps of the same site, plot , and horizon. For example, if you picked SR PH 1 1 5-10, you may not also pick SR PH 1 2 5-10. We will make a wall chard to make it easy to track our progress and distribute samples across pickers.

**How to pick**

1. Label a piece of paper with the sample ID.
2. Dump out a manageable amount of sample. For mineral samples, this might be a quarter of the core?
3. For samples that are very moist, letting them dry a little before starting will make it easier to separate the soil from the roots. Don’t let the sample dry out too much, or the roots will fragment.
4. Wear gloves.
5. Pick out the roots from the soil and place them in the appropriate tray by size class. If a root has parts in different size classes, break it up by size class. You can compare your root to wires of different diameters or to lines drawn on the paper.
6. Distinguishing live from dead roots is difficult. If in doubt, consider the root alive. Material that used to be root but is now soil organic matter is not counted. Keeping a tray of your dead roots is helpful so that you don’t have to pick them up again; it should also allow for cross-checking and consistency between root-pickers.
7. Getting the soil off the roots is difficult. It tends to fall off the root as it drives. You can put dirty roots in the trays and tap soil off the roots as you put them into vials.
8. When you have removed all the obvious large roots, the tedium begins. Suzanne advises against “hunting and pecking” root fragments from the whole pile of soil. She pushes the soil into a pile and sorts through it once in one direction, then piles it up and sorts through it again in a different direction. This could go on indefinitely (new root fragments pop up each time you pile the soil). So limit yourself to a certain number of passes or a time limit (20 more minutes to finish the pile).
9. When you think you are done, ask BB or another certified root picker to look over your sample and share your judgment.
10. Put the roots into vials by size class. Label the vials with the sample ID and the size class.
11. Sign off on the wall chart, and pick your next sample.

**Things we still need**

1. Find good places to sit to work. We might start in Nifkin Lounge.
2. Get more tweezers. Get weigh boats. Do we have lots of glass scint vials?
3. Order a magnifier.
4. Ask around ESF to see if there is a microscope we could borrow for the lab.
5. Get a refrigerator for the lab. I have a call in to Physical Plant. If they don’t have one, call DeSantos for used appliances.
6. Make a schedule of supervisors for interns picking roots.

What am I forgetting? We’ll find out soon! We’re expecting 4 interns Monday morning. I’m hoping that Sunny, Sarah, and Jen (Ryan is with Kim this week) will become expert pickers, capable of supervising interns. We will train another batch of interns next Monday (along with Ryan). After that, everyone will have been trained. We should be able to devote hundreds of hours to root picking before the summer is over.

Maybe the most important thing we need is a list of motivational tricks. Each person who finishes a root core gets to change the radio station? Let me know what works.